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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/427,639	10/27/1999	SHUNPEI YAMAZAKI	0756-2053	3558

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EXAMINER	
NELSON, ALECIA DIANE	

ART UNIT	PAPER NUMBER
2675	

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/427,639	YAMAZAKI ET AL.	
	Examiner	Art Unit	
	Alecia D. Nelson	2675	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. ***Claims 1-9*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al. (U.S. Patent No. 4,090,219) Ohwada et al. (U.S. Patent No. 4,750,813), and Hata et al. (U.S. Patent No. 5,439,837).

With reference to **claims 1-4, 6, 7, and 9**, APA teaches a driving method for a liquid crystal display, wherein a red, a green, or a blue black light turns on corresponding to display of the red, green, or blue image, said method comprising the step of: compressing original video signals by 1/(3n) times in a time axis direction by a n-speed field sequential color signal generation circuit, in the Applicant discussion of the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. APA also teaches wherein the n-speed field sequential color signal generation circuit supplies a turn-on timing signal to a turn-on circuit and a field sequential color video signal to a controller, with said turn-on circuit being operationall connected to the at least one backlight, and with the controller being operationall connected to a display section in the discussion of the video signal supplied to the liquid crystal panel being obtained by compressing an original red, green, and blue video signal entered from outside to one-third the time axis direction, and that the red, green and blue LEDs are turned on successively during their corresponding LED turn-on periods (Tr, Tg, Tb) (see page 2, line11-page 3, line 21).

While teaching all above, the admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes. Even though it is taught that the display device of the admitted prior art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). With reference to **claims 2, 4, and 7** Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. With further reference to **claims 3 and 6**, Ernstoff et al. teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1) comprising a plurality of first thin film transistors provided over said substrate; a driver circuit (4, 5) comprising a plurality of second thin film transistors provided over said substrate for driving the active matrix circuit, and a n-speed field sequential color signal generation circuit (8) comprises a third thin film transistor over said substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon.

Hata et al. teaches an AM-LCD composed of thin-film transistors wherein the TFT has a channel region comprising crystallized silicon (see column 1, lines 8-30), wherein the TFT has a low concentration impurity region (10, 20) adjacent to the channel forming region (12b) (see column 6, lines 51-56, column 7, lines 30-48).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art in order to provide an AM-LCD having high resolution and high brightness. Further it would have been obvious to one having ordinary skill in the art to allow the AM-LCD as taught by the combination of the admitted prior art and Ernstoff et al. to be constructed similar to that which is taught by Ohwada et al. and Hata et al. in order to thereby allow all or a majority of the circuitry to be composed as an integrated circuit which requires less space in order and to provide stabilization of characteristics of the transistor in order to provide the user with a liquid crystal field sequential display that has improved display quality and a reduced amount of flicker observed by the user.

With reference to **claims 5 and 8**, while the references teach all that is required as explained above, none of the reference teach that the liquid crystal display is a ferroelectric liquid crystal display device.

However, the examiner takes Official Notice that the usage of a ferroelectric liquid crystal display device is obvious and well known to those

skilled in the art, wherein a ferroelectric type liquid crystal is well known type to be used in display device.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use a ferroelectric liquid crystal display, or any other type of liquid crystal display; in order to provide a driving method which could be carried in order to provided better display quality.

4. ***Claims 10-31*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., and Hata et al. as applied to **claims 3 and 9** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claims 10 and 21**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract). However, with reference to **claims 11-20 and 22-31**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to one having ordinary skill in the art to allow for the liquid crystal display device as taught by the admitted prior art, Ernstoff et al., Ohwada et al., and Hata et al. having the advantages as explained

above, including a reduction in noticeable flickering, to be constructed in a plurality of different devices to thereby increase the marketability of the product.

5. ***Claims 32-34*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al, Hata et al., and Konno et al (U.S. patent No. (5,327,229).

With reference to **claims 32-34** APA teaches a driving method for a liquid crystal display, wherein a red, a green, or a blue black light turns on corresponding to display of the red, green, or blue image, said method comprising the step of: compressing original video signals by 1/(3n) times in a time axis direction by a n-speed field sequential color signal generation circuit, in the Applicant discussion of the conventional art of a field sequential driving method in which one image frame is divided into three subframes and each one of the red, green and blue backlights are turned on for one-third frame duration to display an image corresponding to that color for one-third frame duration. APA also teaches wherein the n-speed field sequential color signal generation circuit supplies a turn-on timing signal to a turn-on circuit and a field sequential color video signal to a controller, with said turn-on circuit being operationally connected to the at least one backlight, and with the controller being operationally connected to a display section in the discussion of the video signal supplied to the liquid crystal panel being obtained by compressing an original red, green, and blue video signal entered from outside to one-third the time axis direction, and that the red, green and blue LEDs are turned on successively during their

corresponding LED turn-on periods (Tr, Tg, Tb) (see page 2, line11-page 3, line 21).

The admitted prior art fails to discuss displaying each of the red, green, and blue images in each of the subframes. Even though it is taught that the display device of the conventional art is an AM-LCD there is no discussion of the specific components of the LCD panel as claimed.

Ernstoff et al. teaches a liquid crystal field sequential color display in which one image frame comprises 2 fields, each of which comprises a red image, a green image, and a blue image (see column 7, line 68-column 8, line 34). Ernstoff et al. teaches that the frame comprises 2 fields, however it would be possible to have 3 fields in each frame by shortening the duration of each field thereby further reducing the amount of flicker seen by the observer. Ernstoff et al. also teaches that three light sources (204, 206, 208) representing each of the primary colors are operated one at a time, in a repetitive sequence by switch (216), at a rate such that the complete 3-color sequence is completed more rapidly than the flicker fusion frequency. A synchronizing means (222) controls switching means (216) supplying power to the light sources in the manner indicated in Fig. 10 (see column 7, lines 40-58).

Ohwada et al. teaches an AM-LCD wherein the display comprises a glass substrate, which is known in the art to have an insulating surface, wherein the active matrix circuit (1) comprising a plurality of first thin film transistors provided over said substrate; a driver circuit (4, 5) comprising a plurality of second thin film transistors provided over said substrate for driving the active matrix circuit, and a

n-speed field sequential color signal generation circuit (8) comprises a third thin film transistor over said substrate (see column 3, lines 15-20). While teaching the usage of the TFT circuits as claimed, there fails to be any discussion towards the TFT's having a channel region comprising crystallized silicon.

Hata et al. teaches an AM-LCD composed of thin-film transistors wherein the TFT has a channel region comprising crystallized silicon (see column 1, lines 8-30), wherein the TFT has a low concentration impurity region (10, 20) adjacent to the channel forming region (12b) (see column 6, lines 51-56, column 7, lines 30-48).

Konno et al. teaches the usage of a photo-conductive layer (23) in which the impedance thereof is fairly constant by controlling the light absorbance characteristics of the dielectric mirror (24) as such that a leakage of light is reduced and thereby providing a uniform amount of light received by the display.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to allow displaying RGB images in each subframe as taught by Ernstoff et al. along with the drive method of the admitted prior art in order to provide an AM-LCD having high resolution and high brightness. Further it would have been obvious to one having ordinary skill in the art to allow the AM-LCD as taught by the admitted prior art and Ernstoff et al. to be constructed similar to that which is taught by Ohwada et al., Hata et al., Konno et al. in order to thereby allow all or a majority of the circuitry to be composed as an integrated circuit which requires less space, to provide stabilization of characteristics of the transistor, and to have a fairly constant impedance in order to provide the user

with a liquid crystal field sequential display that has improved display quality and a reduced amount of flicker observed by the user.

6. ***Claims 35-45*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admittance of prior art in view of Ernstoff et al., Ohwada et al., Hata et al., and Konno et al. as applied to **claims 32-34** above, and further in view of McDowall et al. (U.S. Patent No. 5,528,262).

With reference to the claims neither the admittance of prior art, Ernstoff et al., nor Ohwada et al. teach the particular type of device that contain the liquid crystal device.

McDowall et al. teaches, with specific reference to **claim 35**, that construction of a color display with particular advantages for head mounted and head coupled displays (see abstract. However, with reference to **claims 36-45**, McDowall et al. further states field sequential displays are of great interest in situations that require small color displays (see column 2, lines 33-44).

Therefore it would have been obvious to allow for the liquid crystal display device with a reduction in noticeable flickering to be constructed in a plurality of different devices to thereby increase the marketability of the product.

Response to Arguments

7. Applicant's arguments with respect to **claims 1-45** have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alecia D. Nelson whose telephone number is 571-272-7771. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on 571-272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KENT CHANG
PRIMARY EXAMINER

adn/ADN
March 2, 2006